

New record and occurrence map of *Tityus serrulatus* Lutz & Mello, 1922 (Scorpiones, Buthidae) in the state of Rio Grande do Sul, southern Brazil

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Abstract: The Brazilian scorpion *Tityus serrulatus* is recorded for the first time in the central region of Rio Grande do Sul, thus filling a gap of 567 km in its distribution. A specimen of the scorpion was collected in the urban area of the municipality of Santa Maria (29°43'51.31" S, 053°48'5.74" W) on 31 June 2014. A map was generated with the points of occurrence of the species in the state.

Key words: *Tityus serrulatus*, Rio Grande do Sul, Santa Maria, geographical distribution.

The genus *Tityus* Koch, 1836, has a wide distribution in South America and also occurs in parts of Central America (Fet *et al.* 2000; Lourenço 2002). It is the richest genus of the order, with 204 described species (Lourenço 2006). Currently, the Brazilian scorpion *Tityus serrulatus* Lutz & Mello, 1922 has as synonyms: *T. serrulatus vellardi* Mello-Leitão, 1939, synonymized by Lourenço (1981); *T. lamottei* Lourenço, 1981 and *Tityus acutidens* Mello-Leitão, 1933, both synonymized by Souza *et al.* (2009). *Tityus serrulatus* belongs to the *Tityus stigmurus* Thorell, 1876 complex (Lourenço 2001; Souza *et al.* 2009).

Tityus serrulatus is a species endemic to Brazil (Almeida 2010). Its holotype is a female from Belo Horizonte, Minas Gerais (Souza *et al.* 2009), the state to which the species was once believed to be restricted (Bortoluzzi *et al.* 2007). Currently, the records of occurrence have been added for the states of Rondônia, Piauí, Ceará, Rio Grande do Norte, Pernambuco, Sergipe, Bahia, Mato Grosso, Tocantins, Goiás, Distrito Federal, Mato Grosso do Sul, Minas Gerais, Espírito Santo, Rio de Janeiro, São Paulo, Paraná, Santa Catarina and Rio Grande do Sul (Figure 1; Almeida 2010; Secretaria de Vigilância em Saúde 2009; Borges *et al.* 2010; Bortoluzzi *et al.* 2007; Lourenço and Eickstead 2003; Souza *et al.* 2009).

Tityus serrulatus is a scorpion with nocturnal and discrete habits. It measures about 50–70 mm long when adult, and has pale yellow colored legs and pedipalps, but with a darker shade of yellow, tending to brown on the trunk, fingers and tip of the tail. The tail is intensely serrated with four or five

teeth on its fourth segment (Almeida 2010; Bortoluzzi *et al.* 2007). The species produces a large amount of venom, very active in vertebrates, and is the main cause of severe scorpion accidents in Brazil (Cupo *et al.* 1994; Eickstedt *et al.* 1996; Freire-Maia *et al.* 1994).

The first record of the Brazilian scorpion in Rio Grande do Sul was reported by Torres *et al.* (2002). The specimen was discovered at a supermarket in Porto Alegre (30° 00'22.32" S, 051°09'22.90" W), after stinging the hand of an employee who was handling fruit. At the time of this accident he was handling a load of fruit coming from the southeast region of Brazil. The second occurrence in the state was made by Bortoluzzi *et al.* (2007) in Uruguaiana (29°45'18" S, 057°05'16" W). Two individuals were found on the premises of a trucking company.

In this study, we notify the encounter of a specimen of *T. serrulatus* (Figure 2) in the municipality of Santa Maria, in the central region of Rio Grande do Sul. On 31 June 2014, one individual was found in the warehouse of a supermarket located on the BR392 highway (29°43'51.31" S, 053°48'05.74" W), in the urban area of the municipality of Santa Maria. The specimen was found climbing the wall of the warehouse.

After the encounter, the scorpion was sacrificed and preserved in 70% ethanol, and later identified under a stereomicroscope. The specimen was 55 mm in total length, and had the typical coloring of the species, being determined as an adult of *T. serrulatus* (Dos Santos *et al.* 2014). The specimen was deposited in Scorpiones collection of the Instituto Butantan, and accessioned as IBSP 6746.

This record fills a gap of about 567 km in the distribution of the species, in a region midway between the two points where the species had been previously recorded. All records of *T. serrulatus* in the state are related to transport zones, or places of potential activity for the dispersal of the species. Thus, we can infer that the distribution of this scorpion has not increased naturally to the state of Rio Grande do Sul, but through human activities. Over 12 years, only three encounters of the species have been reported, and one can assume that the species probably does not have established populations in the state of Rio Grande do Sul.

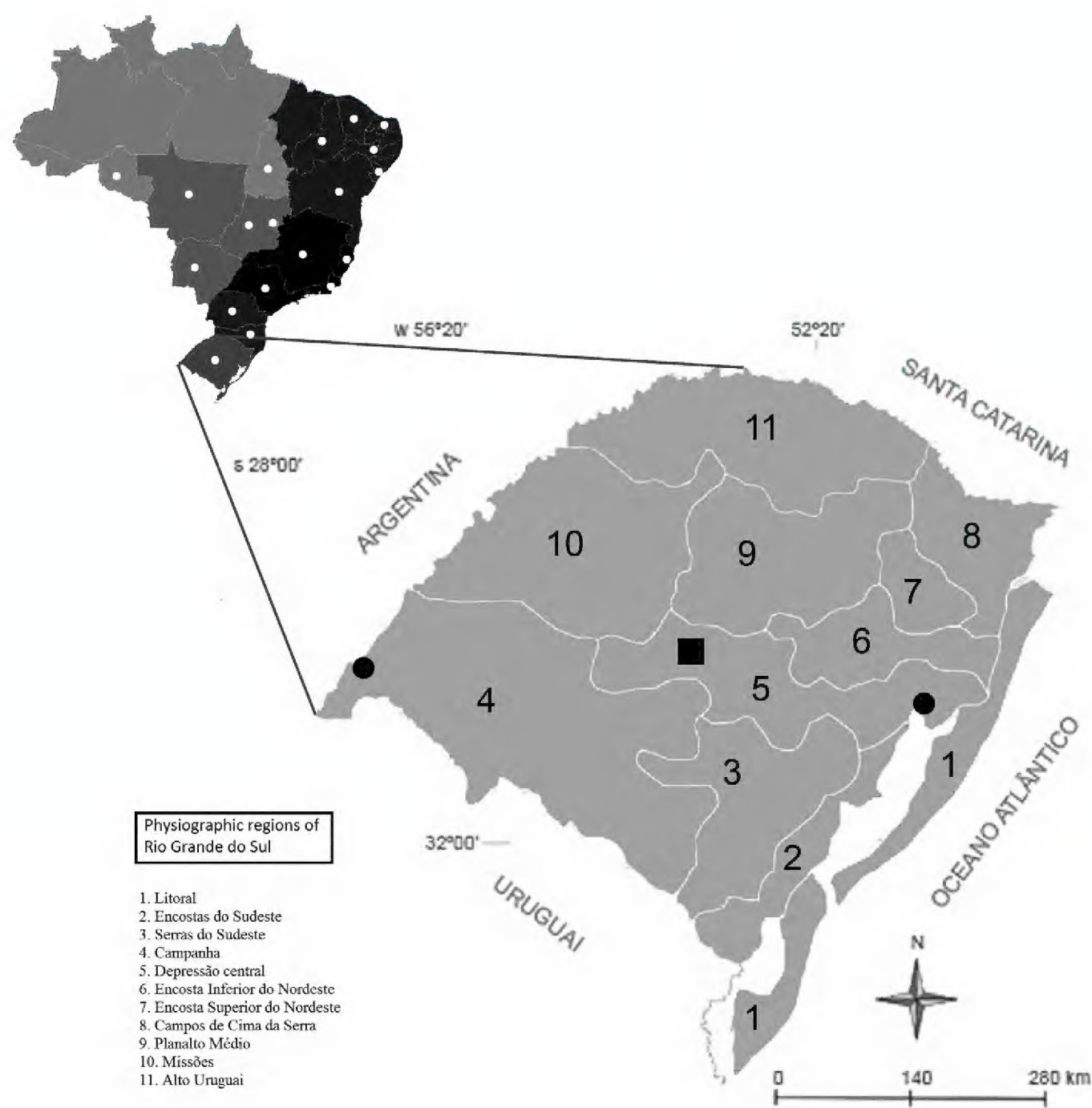


Figure 1. Brazilian states where *Tityus serrulatus* has been confirmed, and below, Rio Grande do Sul state. The square represents the new record from Santa Maria. Circles represent previous records from the state: circle on the left Uruguai (Bortoluzzi *et al.* 2007); circle on the right Porto Alegre (Torres *et al.* 2002)..

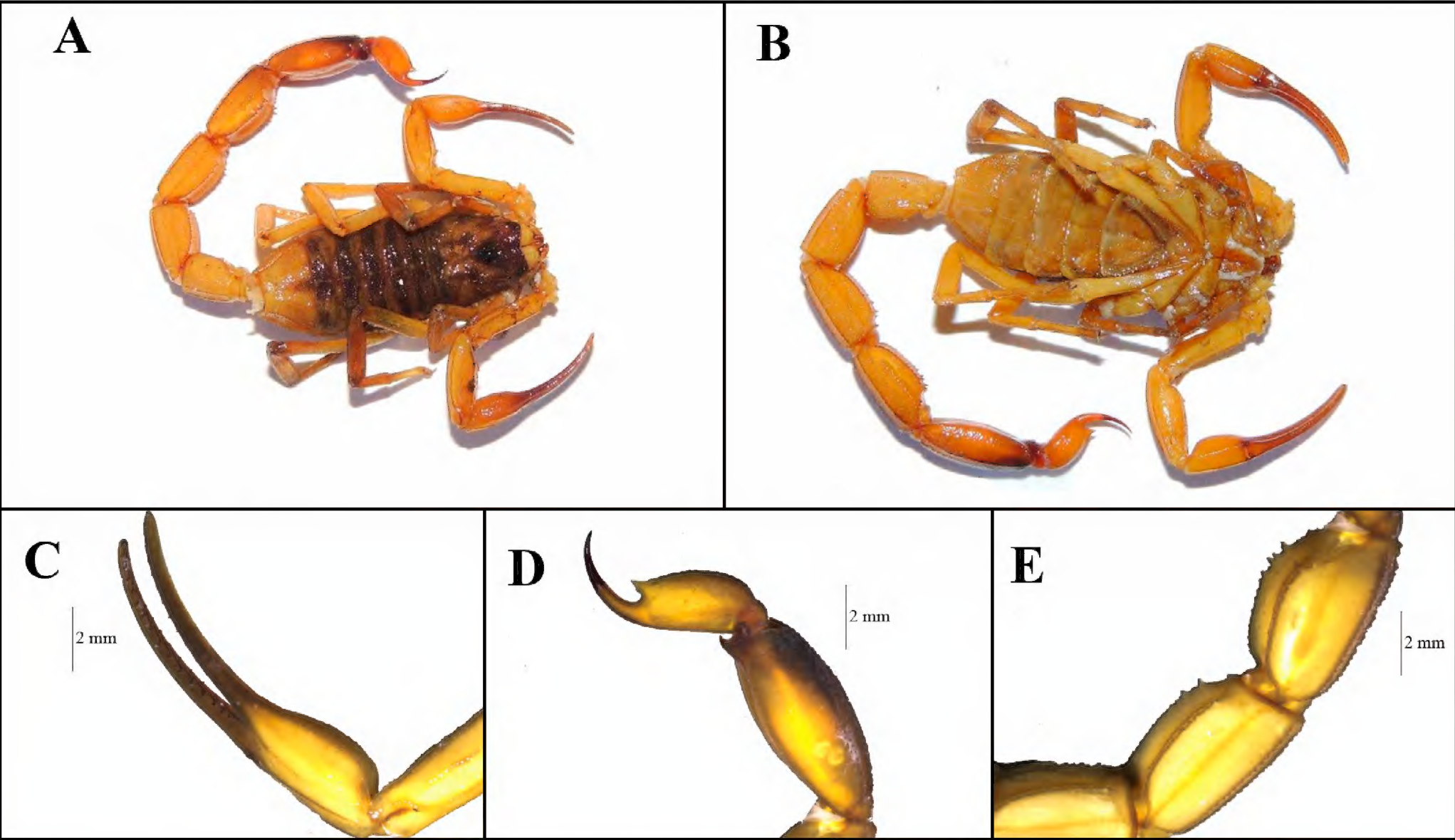


Figure 2. *Tityus serrulatus* from Santa Maria, Rio Grande do Sul state, Brazil. **A:** dorsal view. **B:** ventral view. **C:** palp in dorsal view. **D:** segment metasomal V and telson in lateral view. **E:** metasomal segments II and IV in lateral view.

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LITERATURE CITED

- Almeida, R.B. 2010. Atlas das espécies de *Tityus* C.L. Koch, 1836 (Scorpiones, Buthidae) do Brasil. São Paulo: Tese de Doutorado, Instituto de Biociências da Universidade de São Paulo. 161 pp.
- Borelli, 1899. (Scorpiones: Buthidae) with the description of a new species. *Entomologische Mitteilungen aus dem Zoologischen Museum Hamburg* 14(174): 307–320.
- Borges, A., E. Bermingham, N. Herrera, M. J. Alfonzo and O. I. Sanjur. 2010. Molecular systematics of the Neotropical scorpion genus *Tityus* (Buthidae): The historical biogeography and venom antigenic diversity of toxic Venezuelan species. *Toxicon* 55(2–3): 436–454 (doi: [10.1016/j.toxicon.2009.09.011](https://doi.org/10.1016/j.toxicon.2009.09.011)).
- Bortoluzzi, L.R., M.V.M. Querol and E. Querol. 2007. Notas sobre a ocorrência de *Tityus serrulatus* Lutz & Mello, 1922 (Scorpiones, Buthidae) no oeste do Rio Grande do Sul, Brasil. *Biota Neotropica* 7(3): 357–359 (doi: [10.1590/S1676-06032007000300036](https://doi.org/10.1590/S1676-06032007000300036)).
- Cupo, P., M. Jurca, M.M. Azevedo-Marques, J.S. Oliveira, and S.E. Hering. 1994. Severe scorpion envenomation in Brazil. Clinical, laboratory and anatomopathological aspects. *Revista do Instituto de Medicina Tropical de São Paulo* 36(1): 67–76 (doi: [10.1590/S0036-46651994000100011](https://doi.org/10.1590/S0036-46651994000100011)).
- Dos Santos MD, Porto TJ, Lira-da-Silva RM, Brazil TK. 2014. Description of the male of *Tityus kuryi* Lourenço, 1997 and notes about males of *Tityus stigmurus* (Thorell, 1877) and *Tityus serrulatus* Lutz & Mello, 1922 (Scorpiones, Buthidae). *ZooKeys* 435: 49–61 (doi: [10.3897/zookeys.435.6694](https://doi.org/10.3897/zookeys.435.6694)).
- Eickstedt, V.R.D, L.A. Ribeiro, D.M. Candido, M.J. Albuquerque and M.T. Jorge. 1996. Evolution of scorpionism by *Tityus bahiensis* (perty) and *Tityus serrulatus* Lutz and Mello and geographical distribution of the two species in the state of São Paulo—Brazil. *Journal of Venomous Animals and Toxins* 2(2): 92–105 (doi: [10.1590/S0104-79301996000200003](https://doi.org/10.1590/S0104-79301996000200003)).
- Fet, V. W.D. Sissom, G. Lowe and M.E. Braunwalder. 2000. *Catalog of the Scorpions of the World (1758–1998)*. New York: New York Entomological Society. 690 pp.
- Lourenço, W. R. 2001. The Brazilian scorpion *Tityus stigmurus* (chelicerata, Buthidae) and its complex of morphos, a new model is needed. *Biogeographica* 77(1): 21–34.
- Lourenço, W. R. 2002. *Scorpions of Brazil*. Paris: Les Éditions. 308 pp.
- Lourenço, W. R. 2006. Nouvelle proposition de découpage sous-générique du genre *Tityus* C. L. Koch, 1836 (Scorpiones, Buthidae). *Boletín Sociedad Entomológica Aragonesa* 39: 55–67.
- Matthiensen, F. A. 1971. The breeding of *Tityus serrulatus* Lutz & Mello, 1922 in captivity (Scorpiones, Buthidae). *Brazilian Journal of Medical and Biological* 4: 299–300.
- Secretaria de Vigilância em Saúde. 2009. *Manual de Controle de Esporpiões*. Brasília Departamento de Vigilância Epidemiológica, Ministério da Saúde. 72 pp.
- Souza, C. A. R. Candido, D. M. Lucas, S. M. Brescovit, A. D. 2009. On the *Tityus stigmurus* complex (Scorpiones, Buthidae). *Zootaxa* 1987: 1–38.
- Torres, J. B. M. G. B. Marques, R. K. Martini and C. V. A. Borges. 2002. Acidente por *Tityus serrulatus* e suas implicações epidemiológicas no Rio Grande do Sul. *Revista de Saúde Pública* 36(5): 631–633 (doi: [10.1590/S0034-89102002000600014](https://doi.org/10.1590/S0034-89102002000600014)).

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